Brookhaven National Laboratory

Minutes, LEReC High Energy Extraction Meeting

2017-03-09

Overall Extraction Line – Discussed as follows:

Statements:

- **Model was corrected so dump line is parallel to RHIC cryostat (19.8 degree bend)**

Questions:

1) What is extent of bake-out region along extraction / dump line?
   Answer: Bake-out will go up to second valve of extraction line.

2) What is extent of magnetically shielded region?
   Answer: All of extraction line shall be magnetically shielded where possible. Open spools / drift sections, transitions, and bellows shall be shielded by wrapping magnetic shielding foil around tubes, etc. Contact George for details of magnetic shielding.

3) Are Tees, Bellows, or Valves shielded for beam current?
   Answer: Tees, Bellows, and Valves need not be shielded, but can if possible.

4) Is Laser Wire Scanner a priority?
   Answer: Laser Wire Scanner is a good opportunity since it is a R&D device and can provide valuable information during CW that other devices can do only in pulsed. Use only if it can easily fit. Possibility of moving corrector magnet and/or solenoid to fit it. Possibility of placing it in 2nd open space, but minimal concerns about back-scatter striking it. Determine size and placement, then contact Jorg to verify changes if necessary.

Extraction Line Components, Section 1 – Discussed as follows:

- 20° Dipole (large gap, 2.5” tube)
- Gate Valve #1
- Shielded Bellows
- Profile Monitor #1 (new, details needed from Toby)
- Tee / Ion Pump #1
- Shielded Bellows
- BPM #1 (new)

- Solenoid #1
- Corrector Magnet #1
- Tee / Ion Pump #2
- Shielded Bellows
- Zero Length Adapter Flange (step changes in beam tube are OK)
- Profile Monitor #2 (existing – in use in booster now; move close to Dipole, install rotatable bellows between monitor and Dipole)
- Zero Length Adapter Flange

Questions:

1) What is the chamber size of L.E. PM?
   Answer: Can be answered by Toby.

2) Is the Tee bolted directly to L.E. PM #1?
   Answer: Can be answered by Toby and Mike Mapes.

3) Will Ion Pump magnets affect e-beam?
   Answer: Yes, Ion Pumps should be small and on an elongated Tee so field at beam is less than 1 Gauss. Design similar to DC Gun Test.

4) Shielded Bellows interference with BPM #1, can BPM be moved?
   Answer: Yes, it is OK to move BPMs and Corrector magnets. OK to move Solenoid by no more than tem (10) centimeters.

5) Should there be a bellows after BPM #1?
   Answer: OK to put bellows inside solenoid. Try to minimize support points. More support points means less / shorter magnetic shielding sections.

6) Should PM #2 be bolted directly to 20 degree beam tube as shown?
   Answer: Should be bellows if possible.

Extraction Line Components, Section 2 – Discussed as follows:

- 20° Dipole
- Quad #1 (small diameter from ERL)
- Gate Valve #2
- Corrector Magnet #2
- BPM #2 (existing)
- DCCT
- Conical Reducer (step changes in beam tube are OK)
- Bellows
- Ion Pump / Tee #3
- Conical Reducer (step changes in beam tube are OK)
- Spool

Questions:

1) Does the Gate Valve hang off the dipole beam tube w/o any other support?
   Answer: Can be answered by Mapes.

2) Interference of beam pipe with Quad #2, how can this be corrected?
   Answer: Leave ERL Quad as is and use smaller 2.0 inch diameter beam tube inside magnet.

3) Interference of Corrector Magnet #2 with BPM #2, how can this be corrected?
   Answer: It is OK to move BPM. Verify new position with Jorg.

4) ERL Extraction DCCT is missing; where is it?
   Answer: Nobody knows. Check with Toby or Dan Lehn.

5) Is the Tee bolted directly to L.E. PM #3?
   Answer: Can be answered by Toby and Mike Mapes.

6) nterference of Corrector Magnet #2 with BPM #2, how can this be corrected?
   Answer: It is OK to move BPM. Verify new position with Jorg.
7) Interference of Corrector Magnet #2 with BPM #2, how can this be corrected?
   Answer: It is OK to move BPM. Verify new position with Jorg.

Extraction Line Components, Section 3 – Discussed as follows:

- Ion Pump / Tee #4
- Profile Monitor #3
- Reducer
- BPM #3 (on 5" diameter pipe)
- Bellows
- FCT
- Quad #2 (large diameter from ERL, over-focus quad)
- Ceramic Break (large diameter from ERL)
- Dump (from ERL)

Questions:

1) Is the Tee bolted directly to L.E. PM #3?
   Answer: Can be answered by Toby and Mike Mapes.

2) Does the Ceramic Break need to be shielded?
   Answer: Yes, ceramic break should be shielded.

3) Are we definitely using ERL Over-Focus Quad before the Dump?
   Answer: Yes.

Other Discussion:

Questions:

1) Is the BLM array around the Dump being used, if so is it interlocked for MPS?
   Answer: Probably will not be interlocked into MPS; Sergey will look into and give OK for using BLM array.

- Action Items:
  - J. Fite – Determine correct component gaps and beam tube diameters.
  - J. Fite – Determine status of all beam components and beam tubes.
  - J. Fite – Develop Installation schedule.